

**LOWER PASSAIC RIVER STUDY AREA
PRP DATA EXTRACTION FORM**

PABST BREWING COMPANY

EXECUTIVE SUMMARY:

Pabst Brewing Company ("Pabst") operated a brewery on Grove Street in Newark (the "Site") from 1946 to 1985. The wastewater from the Site contained heavy metals, including cadmium, chromium, copper, lead, nickel, zinc and arsenic, as documented by sampling in the late 1970s. Pabst's process wastewater was discharged into the Passaic Valley Sewerage Commissioners' ("PVSC") Combined Sewer Overflow ("CSO") system and was subject to bypassing to the Passaic River over a number of years, including 29 years before the issuance of the PVSC's National Pollution Discharge Elimination System ("NPDES") permit. Pabst was identified as a "Major Contributing Industry" by the PVSC in 1977 and a "Significant Industrial User" of the PVSC system in 1982, discharging 1.44 million gallons of wastewater per day.

CURRENT MAILING ADDRESS/CONTACT INFORMATION:

Kevin Kotecki, CEO
Pabst Brewing Company
9014 Heritage Parkway
Ste. 308
Woodridge, IL 60517

See, Pabst Website, 2008, Attachment 1 (LPRSA0159787); Hoover's Report – Pabst Brewing Company, 2009, Attachment 2 (LPRSA0159788).

FACILITY ADDRESS:

400 Grove Street
Newark, NJ

See, Heavy Metals Source Determination Study, 1980, Attachment 3 (FNC000001-2).

FINANCIAL VIABILITY (annual revenue and number of employees):

Pabst was originally incorporated in Wisconsin between 1871 and 1874 as Philip Best Brewing Co. The company changed its name to Pabst Brewing Co. in 1889 and re-incorporated in 1920 as Pabst Corp. In 1932, Pabst Corp. was merged by Premier Malt Products Company and the following year the name was changed to Premier-Pabst Corporation. In December 1938 the name was changed again to Pabst Brewing Company. In 1985, Pabst Brewing Company was acquired by S&P Company, whose ownership was given over to the Kalmanovitz Charitable Trust in July 2000. While the company's financial data is not publicly released, the company's sales in 2003 were estimated to be \$600 million.

See, Moody's – Pabst Brewing Company, 1915, Attachment 4 (LPRSA0159736); Moody's – Pabst Corp., 1927, Attachment 5 (LPRSA0159740); Moody's – Pabst Brewing Company, 1984, Attachment 6 (LPRSA0159773); Pabst Company History, 7-21-2004, Attachment 7 (LPRSA0159783); Hoover's Listing – Pabst Brewing Company, 2006, Attachment 8 (FNC000315).

DATES OF OPERATION (include information on predecessors/successors if known):

E. Hoffman & Son Soda and Mineral Water Works ("Hoffman") operated at the Site starting in 1924. Pabst purchased the property from Hoffman on November 15, 1946, and Hoffman and Pabst shared joint tenancy and production facilities for a time. Operations ceased at the facility in 1985.

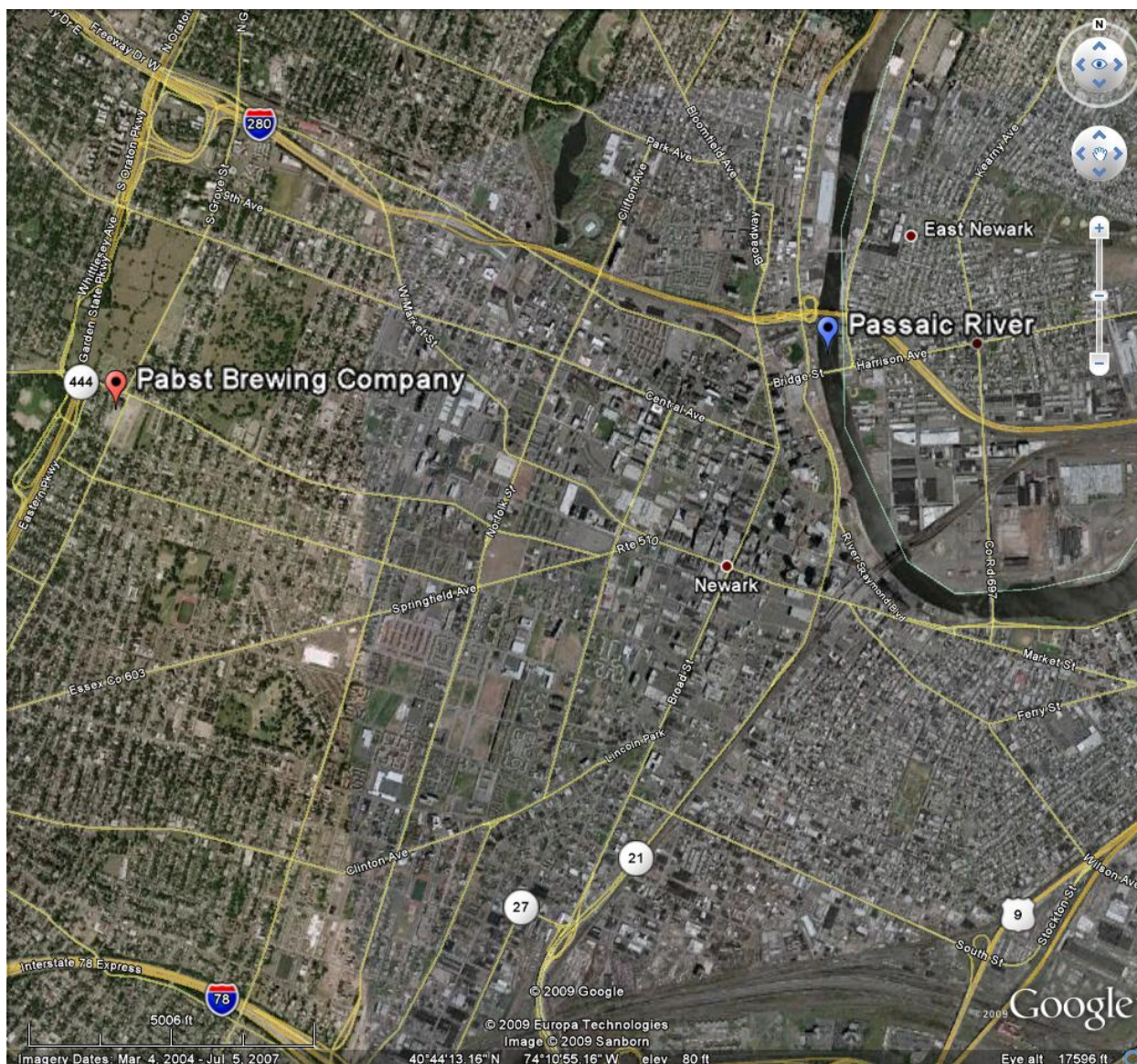
See, Discharge Investigation and Corrective Action Report, Attachment 9 (FNC000265); Pabst NJPDES Permit Files, Attachment 10 (LPRSA0042807).

DESCRIPTION OF FACILITY OPERATIONS (list CERCLA hazardous substances used, manufactured or present):

Pabst Brewing Company brewed and packaged approximately 206,000 barrels of beer monthly at the Site. The principle raw materials used in the operations included barley malt, corn grits, hops, yeast and water. Caustic soda was used onsite to clean recycled beer bottles and spent caustic discharged into the sanitary sewer "without treatment or dilution." The PVSC identified Pabst as a "Major Industrial Contributor" in 1977 and the company is named as a Significant Industrial User ("SIU") on their 1982 permit for discharge into the PVSC system, generating 1.44 million gallons per day ("GPD") of wastewater without pretreatment. During the closing of the plant in June 1985, 1.3 million gallons of beer and 8,000 gallons of anhydrous ammonia were dumped into the sanitary sewer.

See, Pabst NJPDES Permit Files, Attachment 10 (LPRSA0042735-6, LPRSA0042840-1, LPRSA0042847); Pabst Letter, 7-18-1985, Attachment 11 (FNC000165); Industrial Wastewater Questionnaire, 7-10-1978, Attachment 12 (FNC000003); Waste Effluent Survey, 6-6-1972, Attachment 13 (FNC000023); Waste Effluent Survey, 4-14-1975, Attachment 14 (FNC000036); Sewer Connection Permit Application, 1-25-1980, Attachment 15 (FNC000077); PVSC Semi-Annual Report, 1977, Attachment 31 (ABC015402).

The annotated aerial photograph below illustrates the location of the Site relative to the Passaic River.



Source: GoogleEarth, 2009, annotated

Wastewater Generation

The Site's wastewater generation is primarily from the brewing process, utilities cooling and non-contact cooling in packaging. Each of these wastewater sources will be discussed in detail below.

See, NPDES Permit Application, 4-21-1975, Attachment 16 (FNC000054-69).

Brewing/Fermenting

Heavy metals are known to be present in the brewing process and brewery wastewater in general. A 2006 study of brewery waste sludge identified manganese, magnesium, zinc, copper, lead and nickel in sludge created by drying brewery effluent. These are some of the same heavy metals known to be present in Pabst's wastewater from the Site. As detailed below, Pabst was discharging upwards of one million gallons of brewery waste per day without pretreatment, meaning that all heavy metals usually found in wastewater treatment sludge would have been discharged into the sanitary sewer during Pabst's four decades of operation. Pabst's sanitary flow in 1985 was made up of water from the washdown of vessels, piping, equipment, sinks and cooling water from the air conditioners (discussed separately in the Utilities Cooling sub-section below).

See, Pabst NJPDES Permit Files, Attachment 10 (LPRSA0042820); Utilization Potential of Brewery Waste Water Sludge as an Organic Fertilizer, 2006, Attachment 17 (LPRSA0156715); The Composting of Brewery Sludge, 2002, Attachment 18 (LPRSA0156620).

Metals-specific industrial sampling done in 1978 for a study reported in 1980 indicated that Pabst had the following in their effluent:

- Cadmium at 0.009 mg/l, or .118 lbs per day
- Chromium at 0.164 mg/l, or 2.147 lbs per day
- Copper at 0.179 mg/l, or 2.344 lbs per day
- Lead at 0.117 mg/l, or 1.532 lbs per day
- Nickel at 0.011 mg/l, or .144 lbs per day
- Zinc at 0.801 mg/l, or 10.488 lbs per day
- Arsenic at .002 mg/l, or 0.026 lbs per day
- Mercury at .001 mg/l, or 0.0157 lbs per day

Pabst's NJPDES permit application and a waste effluent survey conducted in 1972 report the following additional heavy metals in the Site's effluent:

- Aluminum up to 10.96 mg/l
- Magnesium up to 8.58 mg/l

- Selenium up to .024 mg/l

See, Heavy Metals Source Determination Study, 1980, Attachment 3 (FNC000002); Pabst NJPDES Permit Files, Attachment 10 (LPRSA0042748); Sewer Connection Permit Application, 1-25-1980, Attachment 15 (FNC000082).

Utilities Cooling

The chromium found in the Site's discharge to the PVSC can likely be explained by the use of water for utilities cooling. Pabst was discharging this wastewater to the sanitary sewer, and at the time of the company's operations, it was common for anti-corrosion agents containing chromium or chromate to be added to cooling tower water to guard against the corrosion of the metal parts of the cooling system. In 1987, even after Pabst's operations had ceased at the Site, approximately 15% of comfort cooling towers (for air conditioning) in the country were still using chromium-based water treatment chemicals. This practice was eventually entirely banned in the early 1990s, due to environmental concerns, primarily associated with wastewater discharges.

See, NPDES Permit Application, 4-21-1975, Attachment 16 (FNC000068); Removal of Chromate from Cooling Tower Blowdown by Reaction with Electrochemically Generated Ferrous Hydroxide, 1973, Attachment 19 (LPRSA0159812); Chromium Emissions from Comfort Cooling Towers – Background Information for Proposed Standards, 1988, Attachment 20 (LPRSA0159798-801); Chromate Removal in Closed HVAC Recirculating Systems, undated, Attachment 23 (LPRSA0159791).

If chromates were used alone in the water, a concentration above 200 ppm was necessary to maintain corrosion protection; however, lower concentrations of chromates could be used if they were combined with other chemicals, commonly zinc or phosphate. EPA stated in 1987 that "a large amount of data has shown that the average concentration of chromate in industrial process cooling towers is 13 ppm" and that for "comfort cooling towers" (i.e., air conditioning), a reasonable assumption would be 10 ppm.

See, Chromium Emissions from Comfort Cooling Towers - Background Information for Proposed Standards, 1988, Attachment 20 (LPRSA0159805, LPRSA0159811).

In addition to the chromium-based anti-corrosion agents introduced into the cooling tower water, typical water treatment programs included an antiscalant, an antifoulant, a dispersant, a surfactant, a biocide and an acid and/or caustic soda for pH control. These additives are made up of "many combinations of various chemicals." Anti-scalants and anti-foulants were often made of calcium carbonate, calcium sulfate and calcium phosphate. If phosphonates were used instead of phosphate, it was often necessary to add benzotriazole (or another azole) to minimize the corroding effect of

chlorine combined with phosphonates. Microbiocides were usually made from chlorine, bromine, iodine, methylene bithiocyanate, or, rarely, from acrolein or heavy metals. See, Chromium Emissions from Comfort Cooling Towers - Background Information for Proposed Standards, 1988, Attachment 20 (LPRSA0159801-11).

A patent application from 1971 for a cooling tower water treatment system describes the customary practice of continuously running a chemical pump to inject the various anti-scalants, anti-corrosives into the system and periodically adding large quantities of algicide as well. These systems included a water bleed system to allow the water “saturated with large quantities of minerals and chemicals” to be removed from the system and replaced with fresh water. See, US Patent - Cooling Tower Water Treatment System, 1971, Attachment 21 (LPRSA0159833).

As late as 2003, a patent application described air conditioning condensate as “laden with various chemical constituents and heavy metal concentration.” See, US Patent – Air Conditioning Condensate Drainage System, 2003, Attachment 22 (LPRSA0159822).

Non-Contact Cooling Water

Starting in 1964 or 1965, Pabst began discharging non-contact cooling water into the Orange Avenue storm sewer to “avoid hydraulically overloading the sanitary sewer system.” For a period of time from sometime after December 3, 1980 until at least July 1983, this effluent was re-directed into the sanitary sewer due to a problem with chemical oxygen demand (“COD”). The storm sewer in Orange Avenue leads eventually to Maybaum Creek and from there to the Rahway River.

See, Pabst NJPDES Permit Files, Attachment 10 (LPRSA0042714, LPRSA0042781, LPRSA0042802).

Site Remediation

In 1991, a Closure Plan for nine underground storage tanks (“USTs”) at the Site was submitted by the subsequent property owner and approved by NJDEP. Tanks E1 through E4, located near the loading docks for Building 14, were used to store No. 6 heating oil for the boilers. Tank E5 was a No. 2 diesel fuel tank for use in Building 7; Tank E6 was a 20,000-gallon tank used to store No. 2 diesel fuel for use in trucks and/or a compressor/generator in Building 17. Tank E7 was, in fact, two interconnected 2000-gallon gasoline tanks for the motor pool in Building 17, and Tank E8 was a 1,000-gallon gasoline tank, also for the motor pool. E9 was a 4,000-gallon No. 2 diesel fuel tank close to tank E5. Five of these tanks were closed in-place and the other four were removed. Soil sampling was conducted in the excavations and around the tanks that were closed in-place; in addition, soil from the tank excavations was stockpiled and sampled in composite.

See, UST Closure Summary Report, 3-1992, Attachment 24 (FNC000224-9, FNC000232).

Site Soil Sampling and Contamination

Site soils have been analyzed and found to contain the following levels of the constituents listed below.

- VOCs up to 791,000 ppb
- Barium up to 802 ppb
- Lead up to 183 ppb
- Aroclor 1254 up to 2,560 ppb
- Total BTEX up to 791 ppm
- Non-Targeted VOC up to 3,185 ppm
- Total B/N up to 21.391 ppm
- Non-targeted B/N up to 22.520 ppm
- Lead up to 12 ppm
- Phenanthrene up to 3.3 ppm
- Anthracene up to 0.72 ppm
- Fluoranthene up to 4 ppm
- Pyrene up to 2.8 ppm
- Chrysene up to 1.8 ppm
- Benzo(a)anthracene up to 1.5 ppm
- Benzo(b)fluoranthene up to 2.8 ppm
- Benzo(a)Pyrene up to 1.6 ppm
- Ideno(1,2,3-C,D)Pyrene up to 0.92 ppm
- Benzo(GHI)perylene up to 0.86 ppm
- TPH up to 4,540 ppm
- Methylene chloride up to 0.049 ppm
- Toluene up to 683 ppb
- Ethylbenzene up to 717 ppb
- Xylenes up to 5,000 ppb

As discussed under Permits below, the Site's stormwater drainage is to the Rahway River.

See, Discharge Investigation and Corrective Action Report, 3-26-1992, Attachment 9 (FNC000282, FNC000285-6, FNC000292-3); UST Closure Summary Report, 3-1992, Attachment 24 (FNC000218, FNC000246, FNC000248, FNC000255-6).

Site Groundwater Sampling and Contamination

During the closure of the tanks in October and November 1991, two monitoring wells were installed around the former E7 and E8 locations only, as these were gasoline tanks and gasoline has a higher likelihood than fuel oil of reaching the water table. A third monitoring well was installed in December 1991,¹ downgradient of the former diesel tank (E5). Sampling performed on these wells in 1992 found the following levels of the constituents listed below.

- Total BTEX up to 38,800 ppb
- Total MTBE up to 100 ppb
- Total TBA up to 1,500 ppb
- TICs up to 15,200 ppb
- TPH up to 6,800 ppb
- Naphthalene up to 110 ppb
- Bis(2-ethylhexyl)phthalate up to 30 ppb

See, Discharge Investigation and Corrective Action Report, 3-26-1992, Attachment 9 (FNC000260, FNC000282-3, FNC000290, FNC000292, FCN000294); UST Closure Summary Report, 3-1992, Attachment 24 (FNC000218, FNC000253);

PERMITS (provide dates):

Pretreatment (POTW):

Pabst held Permit No. NJ0028088, permitting discharge of wastewater into the PVSC system, issued November 30, 1982 and expiring October 29, 1986.

See, Pabst NJPDES Permit Files, Attachment 10 (LPRSA0042734).

NJPDES:

Pabst was originally permitted on May 1, 1976 under Permit No. 0028088. Pabst held a subsequent NPDES permit, effective October 31, 1981 and expiring October 29, 1986. The permit indicated one discharge, designated 001, also known as the South Orange Avenue Storm Sewer, and authorizes discharge of non-contact cooling water to the Maybaum Creek – Rahway River via 001. This discharge began in August 1965.

The above-referenced permit was terminated as of June 1986 with respect to both POTW and surface water discharges.

¹ The same document that provides the 1991 date also states that MW-2 was installed in December 1992. Given that this well was sampled in March 1992, December 1991 is assumed to be the correct date.

See, Pabst NJPDES Permit Files, Attachment 10 (LPRSA0042718, LPRSA0042754, LPRSA0042793-4, LPRSA0042802, LPRSA0042828, LPRSA0042835).

NEXUS TO LOWER PASSAIC RIVER STUDY AREA (describe in detail; cite to supporting documentation; date or time period of disposal; list CERCLA hazardous substances; and volume, if known):

Direct (e.g. pipe, outfall, spill):

Information not available at this time.

Sanitary Sewer (provide name and location of sanitary sewer and receiving POTW):

1946-February 1975

All dischargers into “navigable waters” of the United States were required under the Federal Water Pollution Control Act Amendments of 1972 to apply for an NPDES permit from the USEPA. PVSC received its NPDES Permit effective February 28, 1975. See, PVSC NPDES Permit, Attachment 25 (KLL006250).

Although sanitary and storm sewers are separate in the immediate vicinity of the Site, area sewer maps specifically note the private 24” sewer line from Pabst and illustrate how it joins the PVSC’s combined sewer line at Central Avenue. Documents provided by Pabst confirm that their sanitary sewage was discharged to a sewer that fed into the PVSC’s line at Central Avenue. After Pabst’s effluent joined the combined sewer, it was ultimately conveyed to the Clay Street Overflow and into the Passaic River during wet weather events. This is confirmed by the Heavy Metals Source Determination study commissioned by the PVSC in 1978 on the sources of heavy metals in the influent to the treatment plant. The study states explicitly that the heavy metals found in the effluent of the industry included in the study (which included Pabst) was “discharged directly to the Passaic River through the combined sewer outfalls.”

See, Heavy Metals Source Determination Study, 1980, Attachment 3 (FNC000001-2); Newark Sewer Maps, Attachment 26 (LPRSA010920-3, LPRSA010953).

The Clay Street CSO overflow location is described by PVSC as being “on [the] westerly side of [the] intersection of Clay Street and McCarter Highway.” Historical PVSC reports indicate that wastes were routinely bypassed from the PVSC main interceptor to the Passaic River at this location during wet weather events. See, Report Upon Overflow Analysis, 1976, Attachment 28, (KLL017161).

Seymour Lubetkin, Chief Engineer for the PVSC from 1950 to 1978, states in his 1994 affidavit that during his employment with the PVSC, it was common for the combined wastewater and stormwater normally handled by the system's trunk line to be diverted or bypassed directly to the river at times of high volume (i.e., after rainfall). He states that:

...the practice of bypassing was so necessary and frequent that I conclude that the wastestream of every entity connected to a municipal sewer system serviced by the PVSC was bypassed untreated to the Passaic River at some time or another.

See, Affidavit of Seymour A. Lubetkin, 1-6-1994, Attachment 27 (KLL007269-KLL007270, KLL007275).

As discussed above, Pabst discharged to the PVSC system from the Site from 1946 until operations ceased in 1985. For 29 years, between 1946 and February 1975 (the effective date of the PVSC's NJPDES permit), those discharges were not covered by a federal permit. As Pabst's activities at the Site were substantially unchanged during the years of operation, their discharge during the pre-permit time period would have included the contaminants identified in the later sampling.

Based on the figures provided in the 1980 Study for pounds per day of heavy metals, and assuming the Site was operating 6.5 days a week year-round (based on Pabst's statements that they had six-to-seven operating days per week), the Site would have discharged the following to the PVSC during the 29-year unpermitted period, all of which would have been subject to bypass to the Passaic River during overflow periods.

- Cadmium – 1,157 lbs
- Copper – 22,975.9 lbs
- Lead – 15,016.7 lbs
- Nickel – 1,411.5 lbs
- Zinc – 102,803.4 lbs
- Arsenic – 254.9 lbs
- Mercury – 153.9 lbs

(Using the calculation lbs/day x 6.5 days/week x 52 weeks/year x 29 years).

See, Heavy Metals Source Determination Study, 1980, Attachment 3 (FNC000002).

Only chromium is not extrapolated in this manner, as its presence in Pabst's effluent is likely related to onsite cooling units that would not have been in use during the entire 29-year pre-permit time period. However, chromium was being discharged to the CSO system at a rate of 2.147 lbs/day, which would aggregate to more than 725 pounds of chromium over a single year.

February 1975 to 1985

In addition to pre-permit discharges to the PVSC system, Pabst had the following violations or exceedances of its permit:

- For the period February 1, 1983 to April 30, 1983, Pabst reported 11 dates on which its effluent exceeded the permitted pH level of 10.5 (February 1, February 7, February 14, February 22, March 7, March 28, April 4, April 5, April 18, April 19 and April 25, 1983). See Pabst NJPDES Permit Files, Attachment 10 (LPRSA0042697).
- For the period May 1, 1983 to June 10, 1983, Pabst reported four dates on which its effluent exceeded the permitted pH level of 10.5 (May 2, May 3, May 4, June 1). See, Pabst NJPDES Permit Files, Attachment 10 (LPRSA0042698).
- For the period November 1, 1983 to January 31, 1984, Pabst reported two dates on which their effluent exceeded the permitted pH level of 10.5 (December 6, 1983 and January 25, 1984). See, Pabst NJPDES Permit Files, Attachment 10 (LPRSA0042774).
- For the period May 1, 1984 to July 31, 1984, Pabst reported six dates on which their effluent exceeded the permitted pH level of 10.5 (May 22, June 4, June 6, July 17, July 18 and July 31, 1984). See, Pabst NJPDES Permit Files, Attachment 10 (LPRSA0042776).
- For the period August 1, 1984 to October 31, 1984, Pabst reported three dates on which their effluent exceeded the permitted pH level of 10.5 (August 1, August 7 and October 16, 1984). See, Pabst NJPDES Permit Files, Attachment 10 (LPRSA0042769).
- For the period November 1, 1984 to January 31, 1985, Pabst reported four dates on which their effluent exceeded the permitted pH level of 10.5 (November 27, December 7, December 27, 1984 and January 3, 1985); for this same period, Pabst reported that its wastewater contained petroleum hydrocarbons above permitted limits. See, Pabst NJPDES Permit Files, Attachment 10 (LPRSA0042772, LPRSA0042824).
- For the period February 1, 1985 to April 30, 1985, Pabst reported six dates on which their effluent exceeded the permitted pH level of 10.5 (February 6, February 8, February 11, February 15, April 3 and April 15, 1985). See, Pabst NJPDES Permit Files Attachment 10 (LPRSA0042773).

As stated above, non-contact cooling water was discharged from the Site into the Orange Avenue storm sewer to “avoid hydraulically overloading the sanitary sewer

system,” beginning in 1964 or 1965. For a period of time from sometime after December 3, 1980 until at least July 1983, this effluent was re-directed into the sanitary sewer due to a problem with chemical oxygen demand (“COD”). During this time period, Pabst reported permit violations/exceedances relative to the pH limits on their permit as detailed above.

Storm Sewer (provide name and location of storm sewer and receiving waters):

Information not available at this time.

Runoff:

Information not available at this time.

Groundwater:

Information not available at this time.

POTENTIAL NEXUS TO LOWER PASSAIC RIVER STUDY AREA (describe in detail; cite to supporting documentation; date or time period of disposal; list CERCLA hazardous substances; and volume, if known):

Direct (e.g. pipe, outfall, spill):

Newark city directories from 1909 to 1918 list Pabst Milwaukee Beer Depot as a brewer and bottler located at 7-15 E. Fairmount Avenue. A 1908-1909 Sanborn Fire Insurance map shows a John B. Brasser beer bottling operation at this address. If this facility was, in fact, operated by Pabst at one point for brewing and bottling operations, it is almost certain that their wastewater discharge would have contained similar hazardous substances as that discharged from the Site. Since this location was in operation prior to the operational date of the PVSC system, any wastewater discharged would have been sent directly into the Passaic River via the city’s sewers.

See, Newark Sewer Maps, Attachment 26 (LPRSA0010927); Newark Sanborn Map, 1908-1909, Attachment 29 (LPRSA0001736); Newark City Directories, Attachment 30 (LPRSA0157755, LPRSA0157757, LPRSA0158032, LPRSA0158035, LPRSA0158037, LPRSA0158061, LPRSA0158788-9, LPRSA0158955-7, LPRSA0159130).

Sanitary Sewer (provide name and location of sanitary sewer and receiving POTW):

Information not available at this time.

Storm Sewer (provide name and location of storm sewer and receiving waters):

Information not available at this time.

Runoff:

Information not available at this time.

Groundwater:

As discussed above, soils from the former UST closure excavation, which were stockpiled onsite and sampled in composite, contained Aroclor 1254. The source of PCBs in soil could have been an electrical substation present onsite. Currently-available documentation does not indicate that groundwater was sampled for PCBs; however, the presence of PCBs in the excavated soil could mean that they are also present in groundwater. Groundwater flow from the Site is towards the Passaic River.

See, UST Closure Summary Report, 3-1992, Attachment 24 (FNC000227, FNC000230).